

REMARKS

Claims 1-24 are pending in the application. Claims 1-21 have been cancelled without prejudice to their being refiled in a subsequent case. Claims 22-23 were objected to as relying on a rejected base claim. Claims 22, 23 and 24 have now been amended so as not to depend from a rejected base claim and are believed to be allowable. New Claim 25 has been added that is dependent on now allowable claims.

INVENTORSHIP

The joint inventors, Junichiro Fujita, Reinald Gerhardt, Neil Lagali and Louay Eldada, all had a duty to assign to the same entity at the time of filing this application.

REJECTIONS UNDER 35 USC 112

In view of the cancellation of Claims 12, 14, 17, 21 and the amendments to Claims 22, 23 and 24 applicants believe that these rejections are now moot.

REJECTIONS UNDER 35 USC 103(a)

The Examiner has rejected claims 1-8, 10, and 13-20 under 35 U.S.C. 103(a) as being unpatentable over Shintaku U.S. Patent No. 5,905,823. Applicants do not agree that these claims are obvious but has canceled these claims herein without prejudice to their inclusion in a continuation application.

Claims 22, 23 and 24 have all been amended and Claim 25 added to depend from allowable claims. Allowance of these claims is respectfully solicited.

If anything further is needed to advance prosecution, the Examiner is invited to contact applicants' attorney at the telephone number below.

Respectfully submitted,



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MARKED UP CLAIMS

Please cancel: Claims 1-21.

22. (amended herein) [The isolator/circulator of Claim 21] A polarization independent optical isolator/circulator based on a nonreciprocal phase shifter comprising:

first and second Mach-Zehnder waveguide interferometers, each having an input port and an output port, and each one having two interferometer arms, with nonreciprocal phase shifters in the interferometer arms;

said phase shifters comprising a plurality of half-wave retarders or quarter wave retarders; and one or more Faraday rotators with a total rotation of 45°, [wherein one path of each interferometer includes a half-wave retarder,] wherein the slow axes of the [half-wave] retarders are either parallel or perpendicular to each other so that with phase or power compensation between the two paths by either active or passive means, a light that enters through one of the input ports is split in the first interferometer into two linearly polarized components and recombined into one of the output ports in the second interferometer.

23. (amended herein) [The isolator/circulator of Claim 21] The polarization independent optical isolator/circulator of Claim 22 wherein is disposed in one path of each interferometer a half-wave retarder

[wherein at least one of the two interferometers is replaced by an interferometer which has a quarter-wave retarder in each path and an additional 90° path length difference between the two paths, and the slow axes of the two quarter-wave retarders are perpendicular to each other].

24. (amended herein) [The isolator/circulator of claim 21,] The polarization independent optical isolator/circulator of Claim 22 wherein is disposed in both paths of at least one said interferometer a quarter wave retarder and further comprising an additional 90° path length difference between the two paths, and wherein further the slow axes of said quarter wave retarders are mutually perpendicular

[with one or more Faraday rotators having a total Faraday rotation of 45° and a half-wave retarder with the slow axis at 22.5° relative to one of the slow axes of the retarders of Claim 23

in between said interferometers, so that the angle of said linearly polarized light will not change in one propagation direction and will be rotated by 90° in the other propagation direction].

25. (new herein) The polarization independent optical isolator/circulator of Claim 23 or Claim 24 further comprising a half-wave retarder disposed between said first and said second interferometer the slow axis of said half-wave retarder disposed between said first and said second interferometers being oriented at an angle of 22.5° relative to the slow axis of one of the retarders disposed within one of said interferometers so that the angle of said linearly polarized light will not change in one propagation direction and will be rotated by 90° in the other propagation direction.